A FAVOURABLE CONTEXT FOR WALK AND PUBLIC TRANSPORT.

The city of Paris is "only" the centre of the Parisian metropole. Locked up a long time in its walls, the city densified until counting, in the years 1930, nearly 3 million inhabitants on 105km². Even if a vast phenomenon of urban sprawl took place since the Sixties, Paris has a very high density of inhabitants (20 480/km²) - more than three times the rate of central London (6560/km²) - and also a high density of employment (17290/km²). This density is even more favourable to the walk because the urban shape mix the different functions (living, working, shopping…) in the same areas. This relative not specialization of the territories limits the distances to be done; for example, the commercial apparatus of the city is atypical by its density of small local traditional food shops. As a consequence, 67% of the trips to shops in Paris are done on foot!

Consequently, Paris has very high walking and public transport modal shares: for trips inside Paris, walking is the principal mode (55%), far ahead public transport (29%) and private 4wheels vehicles (13%). For trips concerning Paris (Suburbs → Paris, Paris → Suburbs, Paris → Paris), the figures are still good, respectively 35%, 40% and 21.6%.

However, considering the density, the concentration of trips on reduced spaces makes the relatively weak percentage of the car hard to bear: the
presence of the car is considered too important by the majority of Parisians and by the users of the Parisian streets. The levels of pollution generated by the traffic of the whole of Ile-de-France region are beyond some of the objectives given by the EU (for example 40µg NO$_2$/m$^3$). Traffic noise disturbs 46% of the Parisians. The car is implied in 78% of the 7340 annually listed accidents (1/4 of the casualties are pedestrians!). Lastly, 53% of the Parisian roadway’s surface is devoted to the car which generates only 21.6% of trips, percentage to which it is appropriate however to add the important urban distribution of goods.

Considering these figures, the City of Paris launched a wilful policy of reduction of the place of the car in Paris: increase of buses rights of way with physical protections, reshape of quasi urban expressways into true urban boulevards thanks to the reduction of the number of lanes, change of traffic pattern in order to avoid the through traffic in the residential districts. Result: a reduction of 17% of the motor vehicle traffic from 2001 to 2005, and a parallel increase of 8% of public transport patronage and of 50% of bicycle use. Unfortunately, it is not possible to know the annual evolution of walking.

The City of Paris wishes to continue these actions and to still amplify the reduction of the motor vehicle’s traffic. For that, it currently works out a local transport plan, which will be the transcription, on the Parisian territory, of the urban transport plan of Ile-de-France region (PDUIF) adopted in 2001. Among other targets, the PDUIF aims a 10% increase in walking modal share for short trips (less than one km) and trips from house to school. In the “Plan de déplacements de Paris” (PDP), walking will have the first place. The other modes will be thought like "accelerators of pedestrians", walking being the generic mode.

WALKING, FROM THE MAJOR MODE TO THE GENERIC MODE OF TRANSPORT

The “Enquête Globale Transport” (EGT) is a heavy decennial household sample survey which informs about the daily mobility of the franciliens (inhabitants of the Ile-de-France region); the last survey goes back to 2001. What teaches us this survey about pedestrian trips in Paris? Firstly, that this mode of transport, contrary to the perception of much of users of the Parisian streets, is the main mode: on an ordinary working day, 35% of trips including Paris (Suburbs→Paris, Paris→Suburbs, Paris→Paris) are on foot. This figure is even 55% for trips inside Paris. Parisian women are doing 50% of their daily trips by foot while their male counterparts are doing just 42%.

These figures, impressive, however underestimate the share and the number of the trips carried out on foot in Paris. First weakness of the method of survey, it takes into account only a part of the pedestrian trips:

- it underestimates the small trips exclusively carried out on foot, because they are short and natural: they are more easily forgotten by the people inquired. Furthermore, all trips shorter than 300m are not taken into account by the interviewers or during the data capture.
The survey takes into account only trips of the franciliens. However, in
term of the total number of trips, it is necessary to add about 30% of trips
corresponding the number of trips made for delivery of goods, or by non-
franciliens coming to Paris for tourism, leisure or business (Paris is the first
place of professional congresses of the world!)... The important place of
the tourists, keen of walking, must be taken into account. 26 millions of
visitors walk in Paris every year, and it seems that they visit Paris more
and more on foot, but we lack figures about this.

The second and most important weakness is the method of representation of
the results of this survey. To represent trips, we simplify the data by
emphasizing the principal mode of a trip. This principal mode is always a
mechanized mode: personal vehicle or public transport. Thus, if a journey
includes an approaching trip to join a station with a car (P&R), then a trip in a
suburban train and, to finish, a walk from the terminus to the destination, this
combined trip will be deducted as accomplished with public transport.
However, walk, at the origin and the end of any trip, and often during the
interchange, is not counted. If that can be completely justified in the case of a
walk of a few tens of meters between the residence and the car park, this
distorsion can lead to mis-perception of the distribution of the modes.

How to estimate these trips made before or after the principal mode of
transport?
For public transport in Paris, the walking distance depends on the density of
the network, with a distinction between the underground grid (subway and
Réseau Express Regional train - the RER) and the surface network (bus)
which has different logics. For a fine analysis of the distances, it would also be
necessary to be able to calculate (modelling) the impact of the proximity of the
subway station on the modal share, the effect of network which can contribute
to choose to join a more remote station because it make it possible to limit the
connections, and distances covered underground, between the entry of the
subway and the platform. The elements of comfort can also influence the
accepted distance of walk: the quality of the pavements’ coating but also the
environment (noise, pollution, feel of security), the width of the pavements, the
good accessibility of the buses compared with unmechanized staircases to
the subway... On the whole, in waiting of finer studies on these elements, we
can estimate that those trips have an average of 200m, are representing 6
000 000 trips per day in Paris and are equivalent to 1.2million pedestrian*km.
It is to be compared with the “walk only” trips of the EGT : 3 668 000 with an
average distance of 600m : 2 200 800km/day.

For the private car, it is necessary to know the distances between the parking
place and the origin or the destination. A study carried out in 2004 by
SARECO Consultants (Gantelet E. 2004) tried to measure the time of
research for a parking bay. The distances to the destination were measured.
These distances depend on various factors including: the providing of parking
bays, the occupancy rate of these places, the nature of the trip (work,
business, leisure) and its duration, the price which the motorist is ready to
pay, his knowledge of the control of the on-street paying parking and his
willingness to avoid paying, his knowledge of the sector or of the underground car parks and his possible reserve to use them, his patience...!

The results show that it is necessary to distinguish the users according to three main categories classically used in the studies of parking: residents, commuters and visitors.

This study must be supplemented by the knowledge of the walking distances for the off-street parking and the respective weight of these two types of parking. Concerning the commuters’ way of parking, the EGT 2001, previously quoted, shows that 64% of them park on a parking bay placed freely at their disposal by the employer. It will be considered that these places are under the office building - destination of the trip. Concerning the visitors, they park to 79% on the street with only 11% in the public underground car parks. Lastly, concerning the residents, they park on street at 32%. Considering the night saturation of the on-street parking in Paris, the distances to find a parking bay can be very important (sometimes higher than one kilometer!). Some surveys (Gantelet E. 2005) figures it for the centre of Paris: the average distance of on-street parking is 300m. The average distance for commuters parking on-street is about 250m and for visitors is about 150m. We can estimate that the total walking trips linked with the use of a car in Paris are equivalent to 360 000 pedestrians*km. On the whole, car users walk less because a large part of them park just under their destination, specially the commuters and the residents.
In conclusion, current surveys are not sufficient to estimate the importance of walking in Paris. The EGT survey figures a 2200800 pedestrian*km a day but it could be at least doubled!

**CAN WE VOLUNTARILY INCREASE THE DISTANCE OF WALK TO REACH A CAR IN ORDER TO ENCOURAGE PUBLIC TRANSPORT?**

In the light of the previous elements, it is interesting to consider the walking distance to reach public transport or the parked car as a criterion of selection which it is necessary to exploit in order to encourage modal shift. Indeed, among the criteria of the choice of the car, the facility of the door to door is crucial. Even if door to door is rare in Paris, as we saw, the marketing image of the car perpetuate this vision. Also, the walking distance can reduce the reflex use of the car. The fact of having "to go to seek his car" could be compared with the fact of having "to reach the subway station". The walking distance can then encourage to wonder about the most relevant mode and thus to engage a process of modal choice. This increased distance to the car park can also reduce the use of the motorized modes for the short distances, for the benefit of walking or biking. We can recall that 15% of the car trips relating to Paris make less than one kilometre!

Conversely, it is a question of improving accessibility to the stations and stops of public transport by reducing the distance when it is possible, and by improving the comfort of the approaching walk.

However, the voluntary degradation of the effectiveness of the car, although essential ("carrot and stick"), encounters obvious resistances:

- The link between traffic and parking is badly understood by the population. The survey during the debate around the new local plan of town planning showed a strong adhesion with the objective of reduction of traffic (82%) but, in parallel, a reserve to limit the number of extra parking lots under new buildings to achieve this goal (54% of Parisian were against...). To understand this link, it is necessary to integrate that the reduction in the offer of parking can modify the behaviours and allow the modal shift, whereas the majority consider only the short term effects and the lack of modal shift (development of illegal on-street parking instead).
• The car park is naturally perceived as an integral part of housing, shops or places of work, and not as an urban service included in a coherent transport strategy. Consequently, until recently, the municipal policy had for main goal to correct the perceived deficits in parking lots under mainly old pre-car apartment buildings by the construction of new public parkings.

• The reduction of accessibility to the car conflicts with other objectives of the City of Paris, like preserving Parisian social diversity and in particular keeping large families in Paris, more dependent on the car and its easy access

• More largely, it is increasingly easier to make accept measures of improvement of some transport modes than of restriction to the others.

THE IMPLEMENTATION OF THESE PRINCIPLES IN PARIS: ACHIEVEMENTS

The majority of the measures currently implemented by the parisian municipality are dealing with the shortening of the distances and the comfort of the pedestrian accesses to public transport :

• Improvement of the geographic coverage of public transport in Paris is reducing the distances. This improvement can be only marginal, because the existing coverage is of good quality. Nevertheless, this coverage was improved by the opening of very local bus services ("La Traverse" : 2 lines running in the 20th and 13th – 14th districts of Paris, one planned in the 18th and 19th districts), and especially by the improvement of bus services in evenings (increase in the number of bus lines in service after 20h), the weekend and during the night (opening of a new network of night buses from September 2005). At work, a subway line is currently extended in a badly served zone of the South of Paris (district of the Olympiades, 13th district).

• Improvement of the accesses to the subway. The construction of new entries to the subway can make it possible to avoid, for thousands even tens of thousands of pedestrians per day, the crossing of dangerous 2x2lanes streets and an annoying diversion. This expensive work is relatively rare (being planned or studied : subway stations Porte des Lilas, Château Rouge, Balard, RER Javel)

• Improvement of the comfort : the widening of pavements, adaptations for the handicapped people, reduction of the length of the pedestrian crossings and the reduction of two steps crossings, the installation of free toilets and benches, the plantation of trees... All this has a direct impact about the time or the feeling of time spent to join the station.

• Reduction of negative car effects : reduction of car speeds (30km/h zones), reduction of the number of lanes and thus of the traffic...

• The maintenance or the reopening of pedestrian short cuts. In Paris, many roofed passageways constitute useful short cuts for the pedestrians confronted with longitudinally typical blocks of buildings of suburban fabric (old agricultural patterns). We can also quote new pedestrian footbridges above the Seine or beam of railways.
Another measure, concerning the limit of the number of parking bays constructed, was under public scrutiny during the last two years. In the new local plan of town planning (called P.L.U.), the City of Paris decreased the minimum number of parking bays to be build under new constructions of apartment buildings. Before, it was necessary to build a minimum of one place per apartment; now, the rule should be of one parking bay for 100m² of SHON, that is to say one place for a "big" apartment of 75m² and ½ place for a large studio or a small 2rooms, which is compatible with the motorization of Parisians (53% of the Parisian households do not own a car).

Lastly, we can quote the difficulties of on-street parking which is saturated mainly because of a lack of control of the paying parking. Even if this is not wished, a side-effect of this saturation is a contribution to decrease the attraction of the car in two manners: increase in the search time of parking (which generates also additional traffic and pollution!) and of the walking distance.

THE IMPLEMENTATION OF THESE PRINCIPLES IN PARIS: EXPLORATORY WORK

Some of the measures to improvement the pedestrian network implemented until today did not particularly target the access to public transport. In the Transport Plan of Paris under development, it has been decided to define priorities of implementation by targeting geographically according to two logics: locating of accidents implying pedestrians, and closeness of the subway stations and the bus stops.

Several types of measures are being studied:

- A modification of the green light time for the pedestrians. The system of management of the traffic of Paris (SURF 2000) already takes into account the pedestrians in granting them different times of green according to the hours of the day. It is possible to go further determining maximum waiting times not to exceed, to stick more on surveyed or estimated flows of pedestrians (for example saturdays afternoon in the shopping areas), even to try out periods of automobile red lights on all the branches of a crossroads at the same time in order to make it possible to the pedestrians to cross in all the directions including in diagonal (experimentation under technical feasibility study)

- An increase of the pedestrian streets or streets with pedestrian priority. In Paris, the density of pedestrians in certain narrow streets encourage to make evolve their lawful status in order to make a real pedestrian priority

- An adaptation of the width of the pavements, of the width of the pedestrian crossings and of the time of crossing to the flows of pedestrians. That requires a pragmatic approach, starting from countings in entry of subway stations, because counting pedestrians on the streets is too expensive (except if a reliable automatic counting system for pedestrians will emerge soon).

Measures are planned to limit the offer of parking for the commuters:

- Reduction of the number of places at their disposal in the public car parks

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Determination of maximum standards of parking bays to be built in new constructions of offices. This measure will be proposed within the framework of the PDP and would oblige to a modification of the local plan of town planning. However, acceptability by the economic representatives is not obvious, whereas this type of measure exists for a long time in other European countries (ABC Dutch system for example). This measure has a double advantage: the company will have, if it wishes to offer parking bays to its employees, to rent places in car parks available in the district; the cost of the parking should limit these practices to bare essential and encourage company’s transport plans. The increase in the walking distance between the company and the parking bay can also have an impact on the modal split of the employee or on the frequency of car use (mid-day break for example).

A measure for the motorized residents: the “remote” parking

The City of Paris undertook a study (Gantelet E. 2005) to measure the feasibility of the parking of the vehicles of some residents from the central part of Paris in the car parks at the entries of Paris. Indeed, the Parisians use little their car and approximately 50% of motorized Parisians do not use their vehicle daily. The core of Paris know situations of chronic saturation of the on-street parking and the car parks are expensive (150 to 250€ per month!). Conversely, parks at the entries of Paris, accessible in 20 minutes’ subway from the centre of Paris, have an important vacancy (30%) and reasonable tariffs (from 40 to 100€ per month). A survey was carried out: 15% of motorized Parisians would be ready to “displace” their vehicle to these “remote” car parks, at certain tariff conditions; by considering the financial efforts that the City can really agree, it is possible to succeed in convincing from 6 to 7% of motorized Parisians to “displace” their vehicle. The advantage of this project is triple: reducing the difficulties of parking in the central part of Paris, reducing the vacancy of the parks at the entries of Paris, and using the time and distance to the parking (here, distance to be carried out in the subway rather than with foot) like a tool of rationalization of the modal choices and thus of reduction of car trips.

A project for the new urban developments: “mutualisation” of the parking bays

The logic of minimal standards of parking bays to be built under the apartment buildings (and until today, under the office buildings) led, in the urban development areas, to create too many parking bays because each construction will define its needs regarding its peak of demand. However, these peaks of demand are not the same ones for the residences (night peak), the offices (the day, working days), the shops (saturdays) or the leisures (in evening). A first idea consists with mutualisation of the parking bays in a near car park in order to benefit from the good complementarity of the peaks and thus being able to reduce the total number of parking bays to be built. This mutualisation can have other interesting effets: reducing the total costs of construction, reducing the running costs of the parking, increasing the control by the city of the tariffs and the categories of beneficiary
that the municipality wishes to privilege. Especially, from a transport policy’s point of view, the mutualisation creates a distance between the parking and the origin or the destination. This goes against the current practices of construction and approaches the concept of car-free urban developments. In Paris, three areas under development could, in the future, be described as areas sparing in parking: the zone of North-eastern Paris and the area of Batignolles (17th district), a smaller urban development in the 13th district (Rungis).

**CONCLUSION**

The various surveys upon the behaviour of the franciliens as well as the studies carried out by the City of Paris, both show the importance of the walking distance to modify the conditions of competition between public transport and cars. The increase in the distance between the housing and the parking can also limit car trips of short distance for the benefit of walking or biking. If the improvement of accessibility to public transport is a generalized practice, the idea to make more complex the car access by using the parking tool is much less consensual.

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